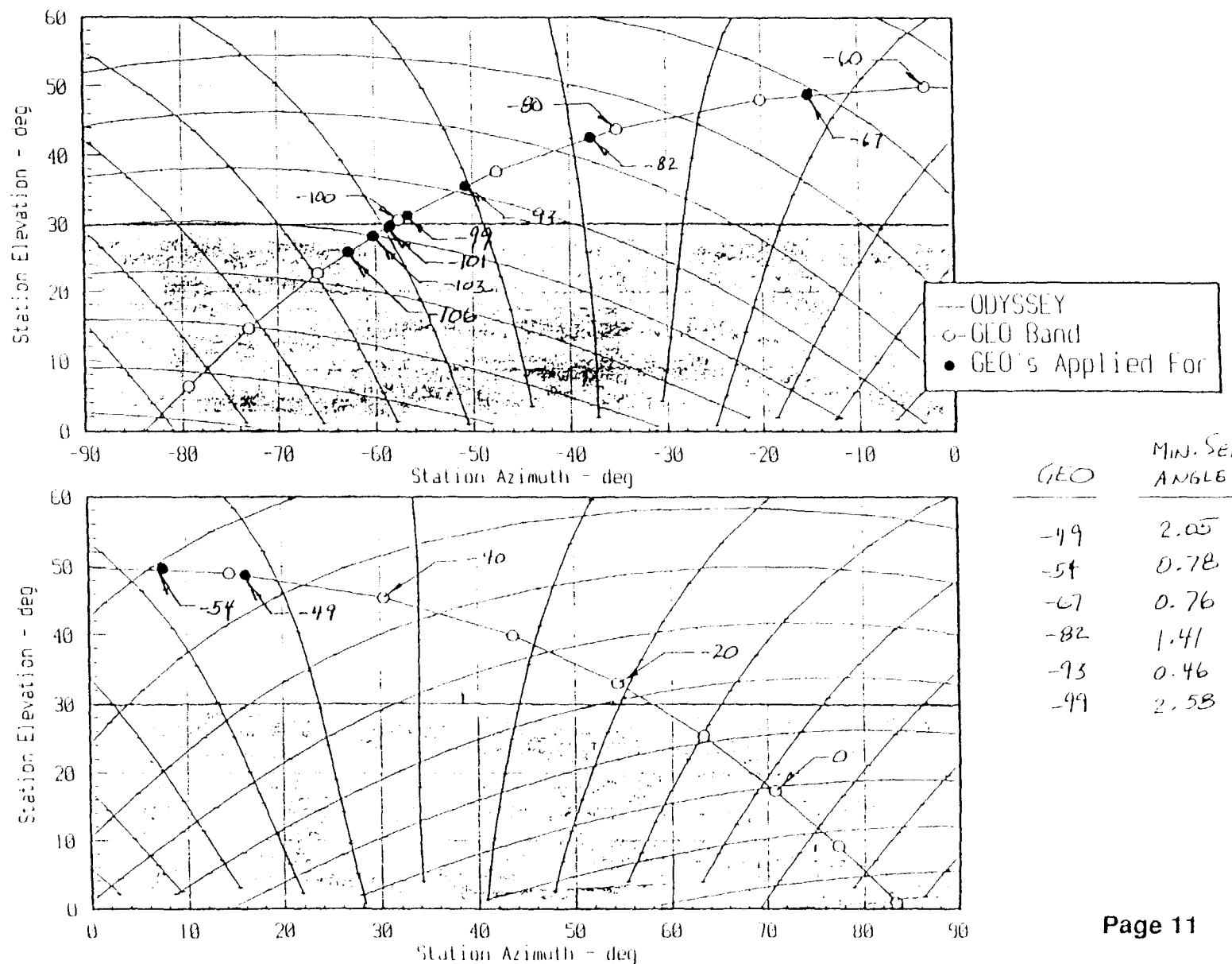
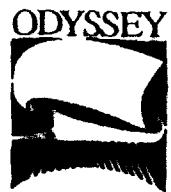


Odyssey/Geostationary Crossings for Buenos Aires Earth Station





Potential Interference Between Odyssey™ and GSO/FSS Systems*

* Based on Galaxy/Spaceway Communication System Parameters



Odyssey™ and Galaxy/Spaceway Satellite Parameters



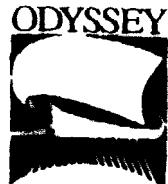
Satellite Parameters	Odyssey	Galaxy/Spaceway
Receive frequency range	29.1 to 29.4 GHz	27.5 to 30.0 GHz
Receive bandwidth (Total)	300 MHz	2500 MHz
Beam bandwidth	300 MHz	120 MHz
Receive Polarization	LHCP	LHCP & RHCP
Receive antenna gain (Peak)	38.5 dBi	46.5 dBi - narrow spot beam 35.0 dBi - wide beam
3 dB Beamwidth	2.2°	~ 1.0° - narrow spot beam ~ 3.2° - wide spot beam
Receive channel bandwidth	2.5 MHz	500 KHz
Receive total system noise Temperature	780 °K or 28.9 dB-K	575 °K or 27.6 dB-K
Transmit frequency range	19.3 to 19.6 GHz	17.7 to 20.2 GHz
Transmit bandwidth	300 MHz	2500 MHz
Transmit Polarization	RHCP	LHCP & RHCP
EIRP	46.4 dBW	59.01 dBW - narrow spot beam 52.3 dBW - wide spot beam
Transmit antenna gain	35.7 dBi (3° beamwidth)	46.5 dBi - narrow spot beam 35.0 dBi - wide spot beam
Transmit channel bandwidth	2.5 MHz	120 MHz
Transmit power density into antenna	-65.0 dBW/Hz (peak)	-67.13 dBW/Hz - narrow beam - 62.36 dBW/Hz - wide beam



Odyssey™ and Galaxy/Spaceway Earth Station Parameters



Parameter	Odyssey	Galaxy/Spaceway
Transmit frequency range	29.1 to 29.4 GHz	27.5 to 30.0 GHz
Transmit bandwidth	300 MHz	2500 MHz - Total bandwidth 500 MHz/Front end Receiver
Transmit Polarization	LHCP	LHCP & RHCP
Transmit EIRP	85.9 dBW	40.9 to 56.6 dBW Depend on antenna size
Transmit antenna gain	64.8 dBi	44.5 to 54.1 dBi Depends on antenna size
3 dB Beamwidth	0.11°	0.36° to 1.09° Depends on E/S Tx EIRP
Transmit channel bandwidth	2.5 MHz	500 KHz, 998.4 KHz or 2.0 MHz Depends on E/S Tx EIRP
Transmit power density into antenna	-55.49 dBW/Hz (peak)	-59.4 to -53.0 dB/Hz Depends on the data rate/ ant.
Receive frequency range	19.3 to 19.6 GHz	17.7 to 20.2 GHz
Receive bandwidth	300.0 MHz	2500 MHz - Total bandwidth 500 MHz/Front end Receiver 125 MHz Per beam
Receive Polarization	RHCP	RHCP & LHCP
Receive antenna gain	60.8 dBi	40.83 dBi to 50.4 dBi Depend on antenna size
3 dB Beamwidth	0.17°	0.55° to 1.67° Depend on antenna size
Receive antenna noise temperature	666.5 ° K or 28.2 dB-K	275 ° K or 24.4 dB-K

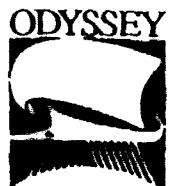


Analysis Assumptions

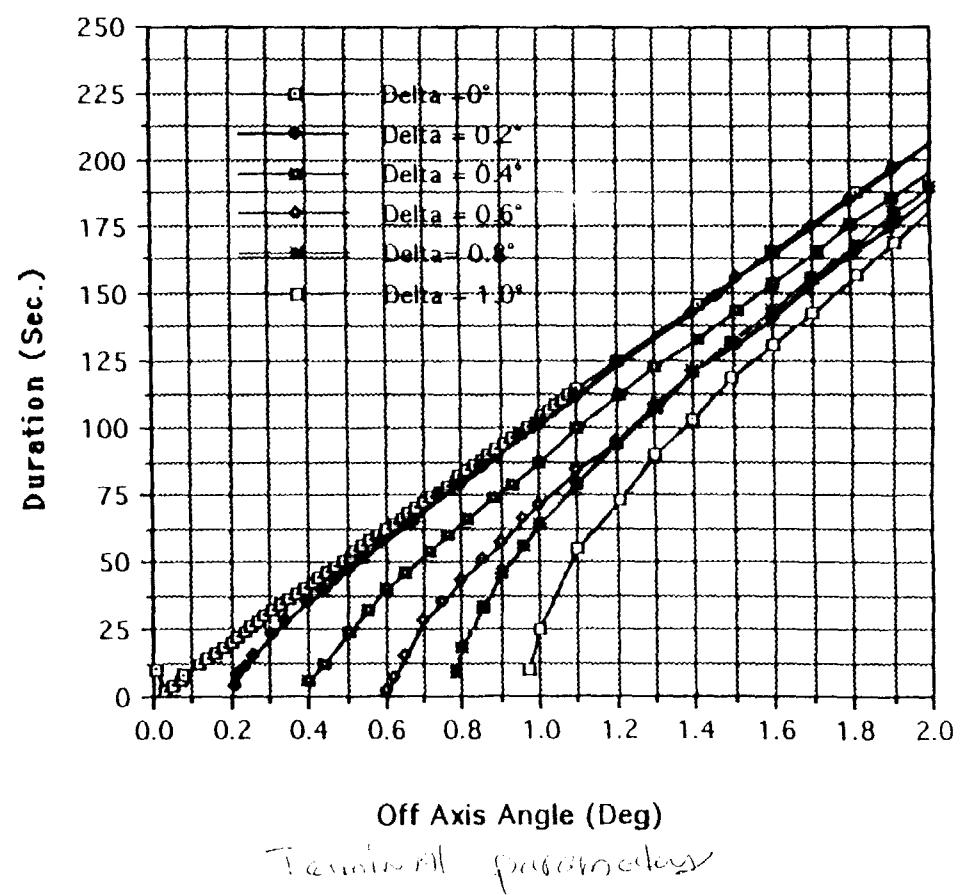
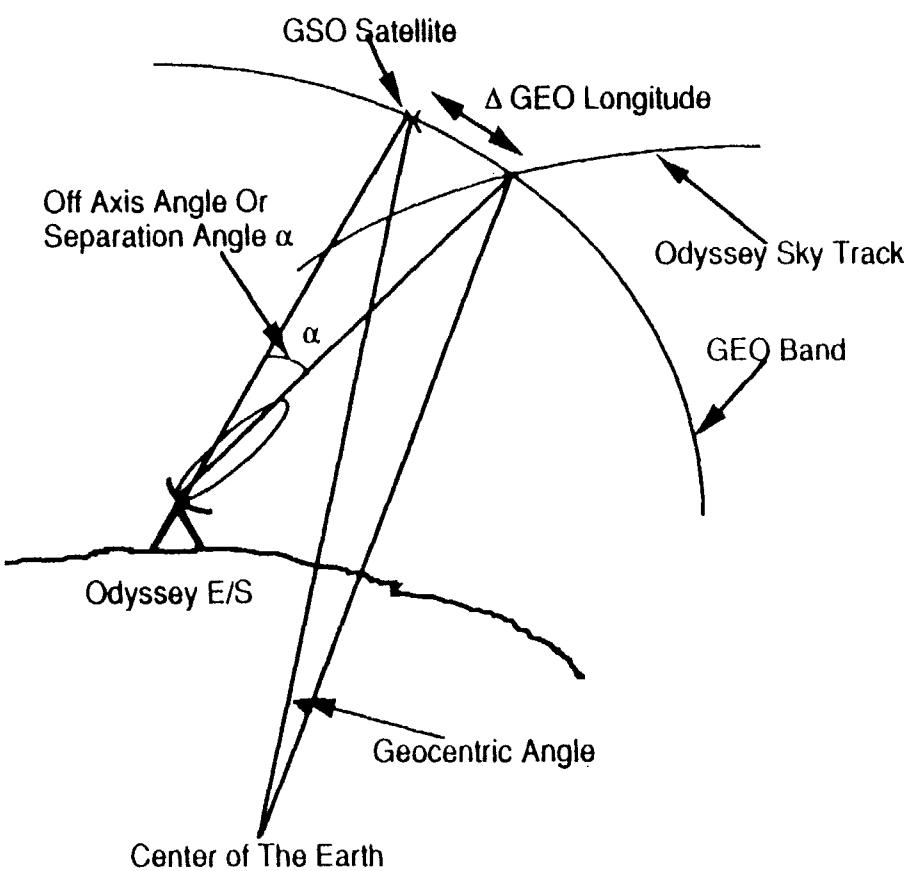


- Galaxy/Spaceway 1.8m terminals work into wide spot beam (3.2° beamwidth) satellite antenna
- Galaxy/Spaceway 0.66m terminals work into narrow spot beam (1° beamwidth) satellite antenna
- Antenna Patterns
 - Actual Odyssey™ satellite transmit and receive antenna patterns
 - Estimated Galaxy/Spaceway satellite antenna patterns, based on CCIR Recommendation 558-4
 - Earth station transmit and receive antenna patterns for both systems based on CCIR Recommendation 580
 - Earth station transmit antenna cross-polarized patterns based on CCIR Recommendation 731

Assumes GSC / Collocated w/ Odyssey



Potential Interference Duration for Different GEO Orbit Separation Angles





TRW

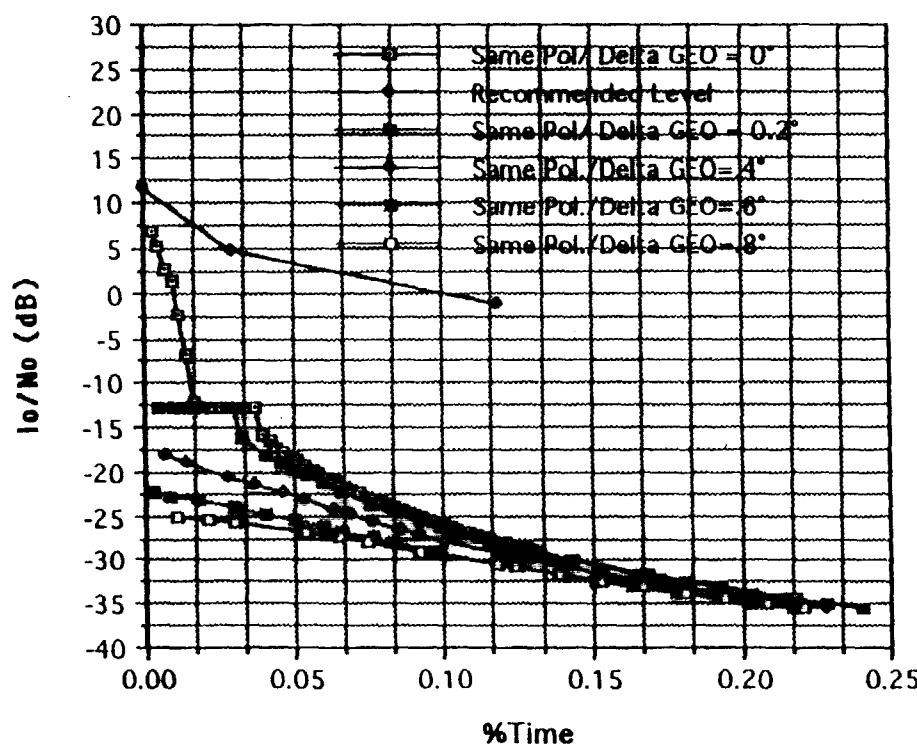
Interference Between Odyssey™ and GSO/FSS Systems with 1.8m Terminals



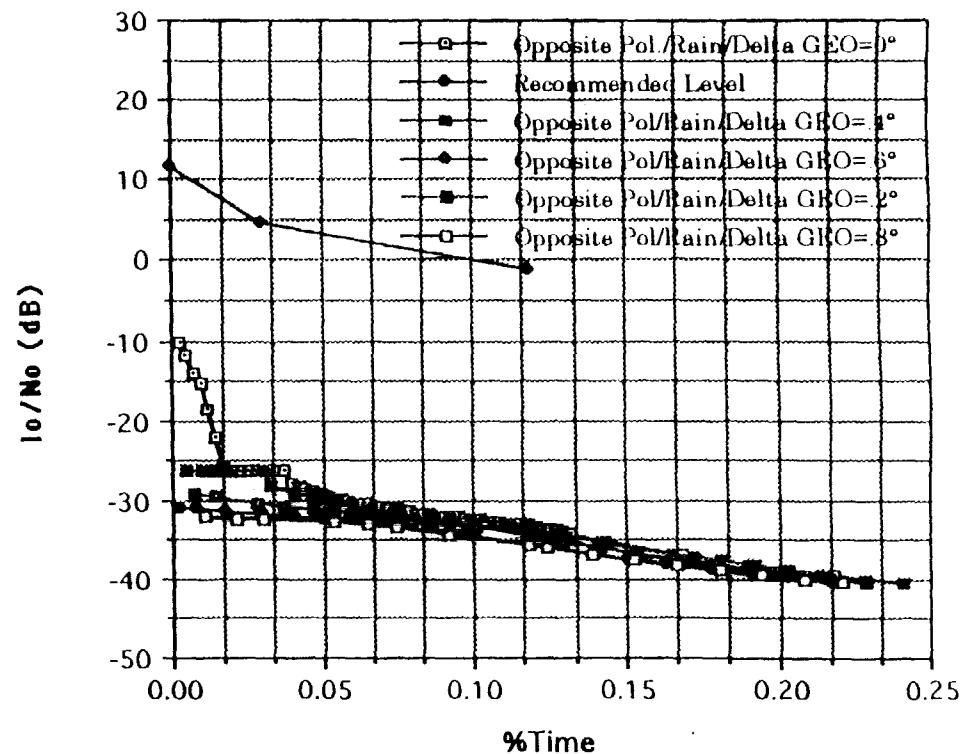
Interference from Odyssey™ Earth Station Into GSO/FSS Satellite Receiver



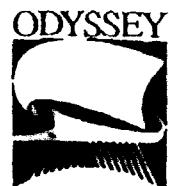
Same Polarization/Clear



Opposite Polarization/Rain



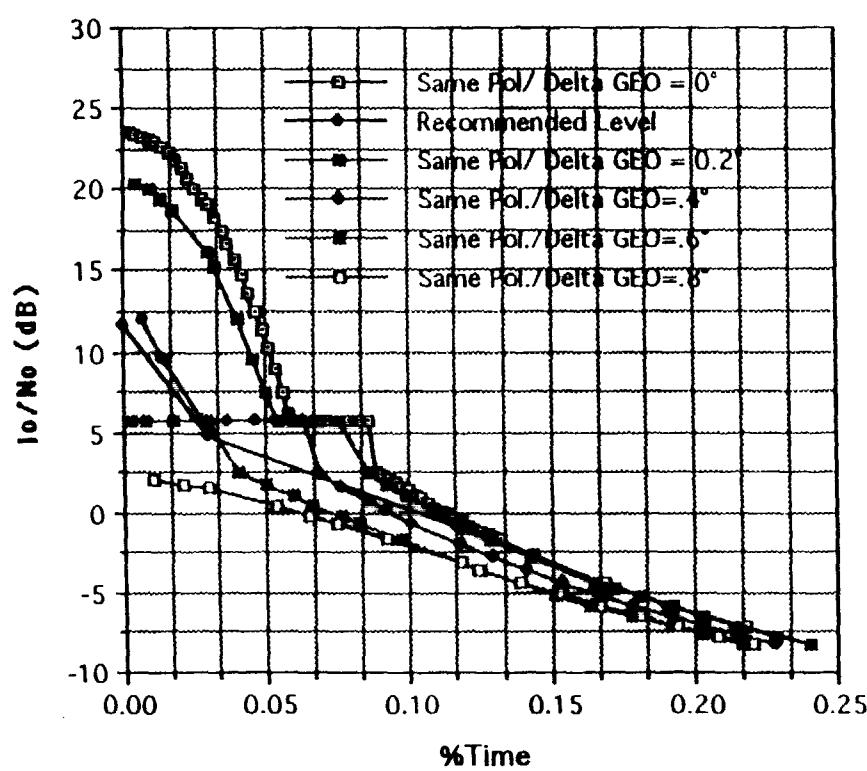
-Fraction of Time



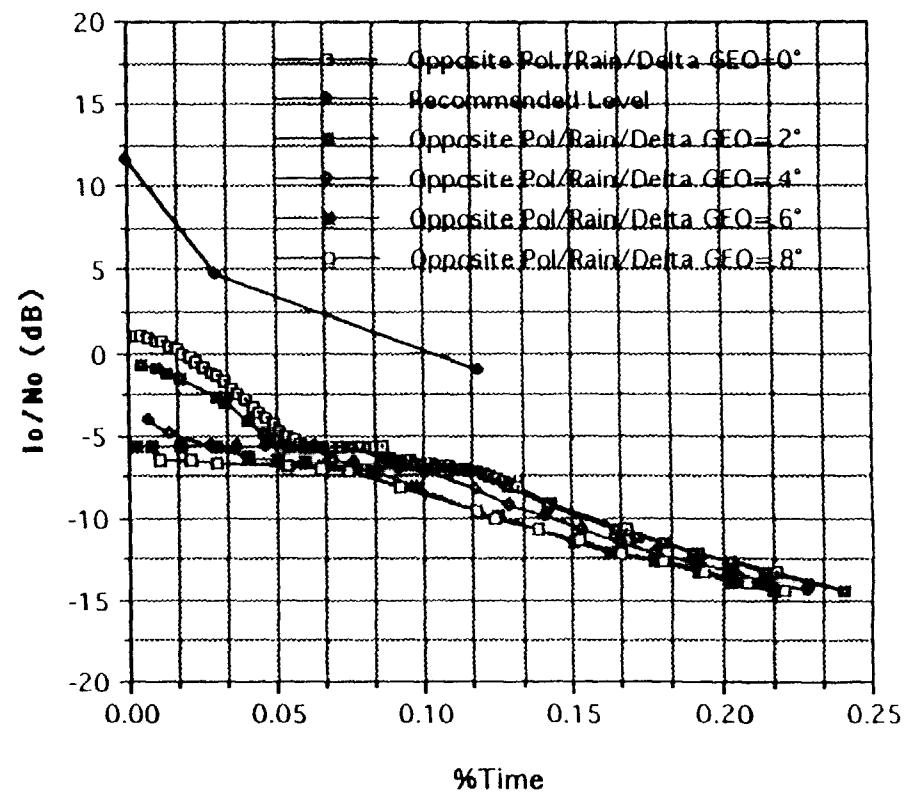
Interference From GSO/FSS 1.8m Terminals Into Odyssey™ Satellite

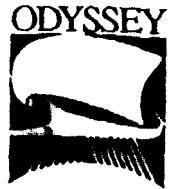


Same Polarization/Clear



Opposite Polarization/Rain

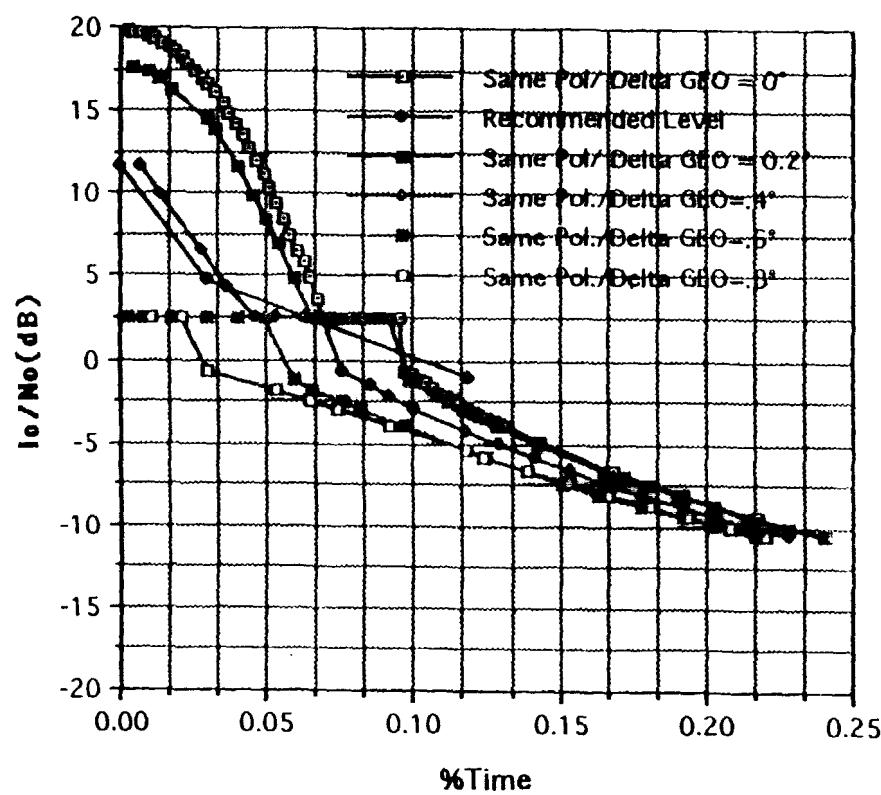




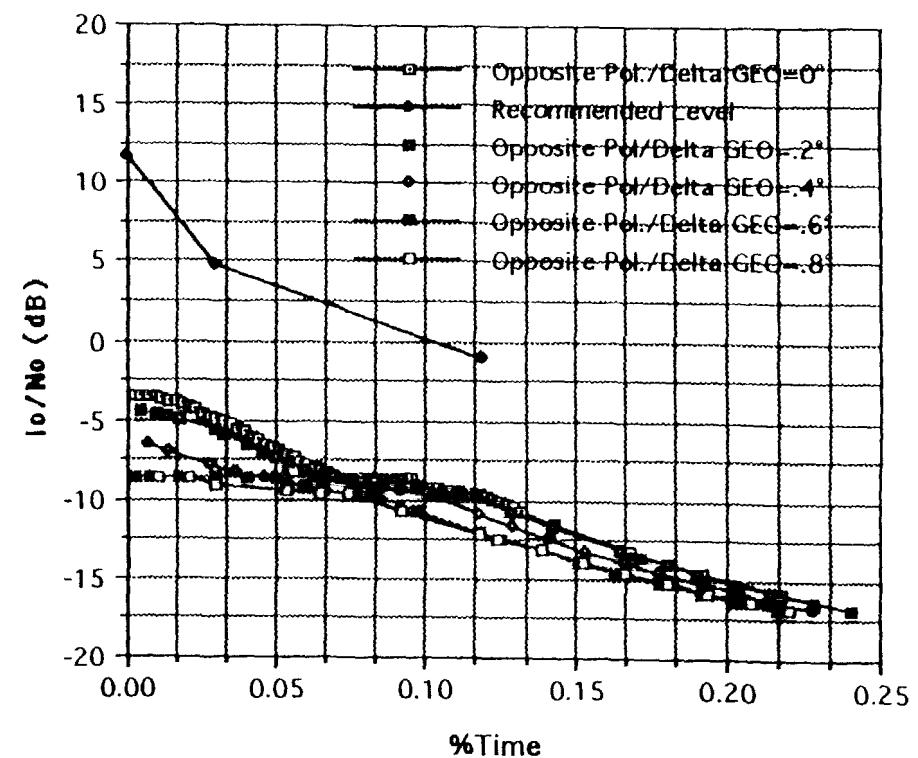
Interference from Odyssey™ Satellite Into GSO/FSS 1.8m Terminals

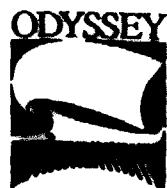


Same Polarization



Opposite Polarization

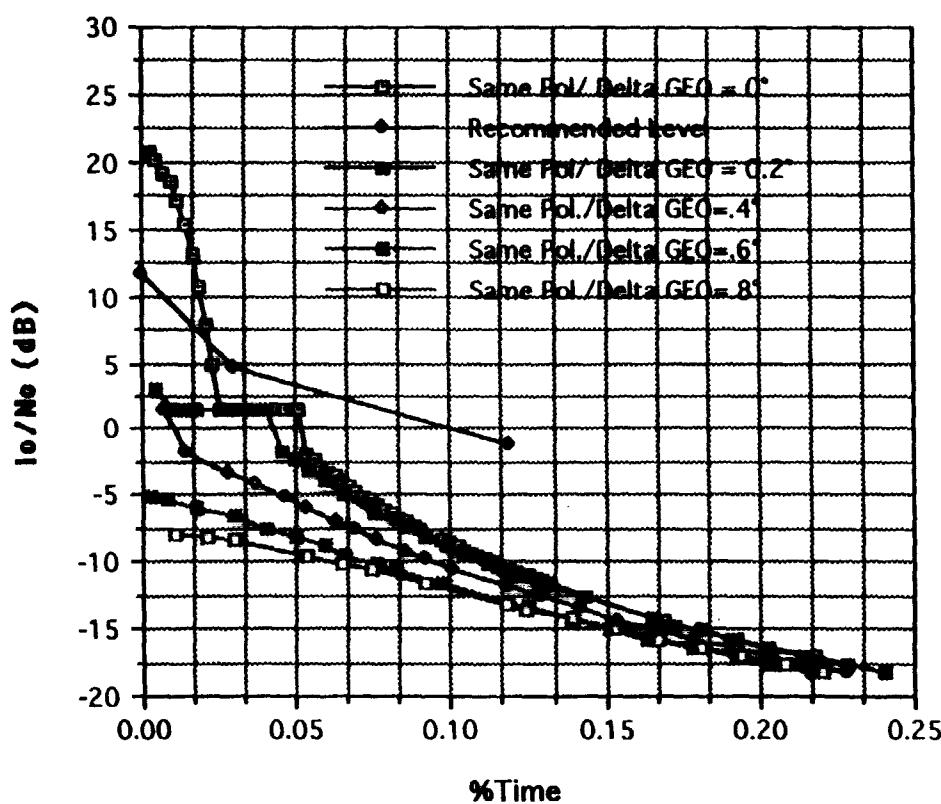




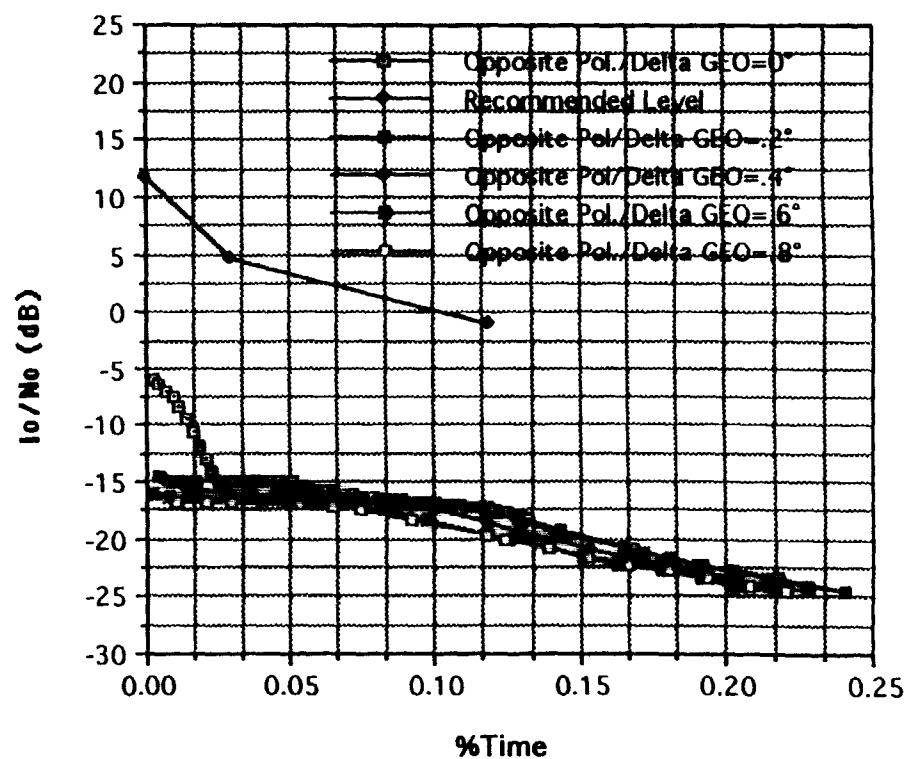
Interference From GSO/FSS Satellite Into Odyssey™ Earth Station

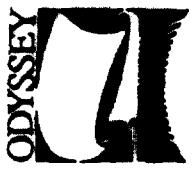


Same Polarization



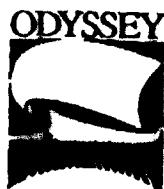
Opposite Polarization





TM

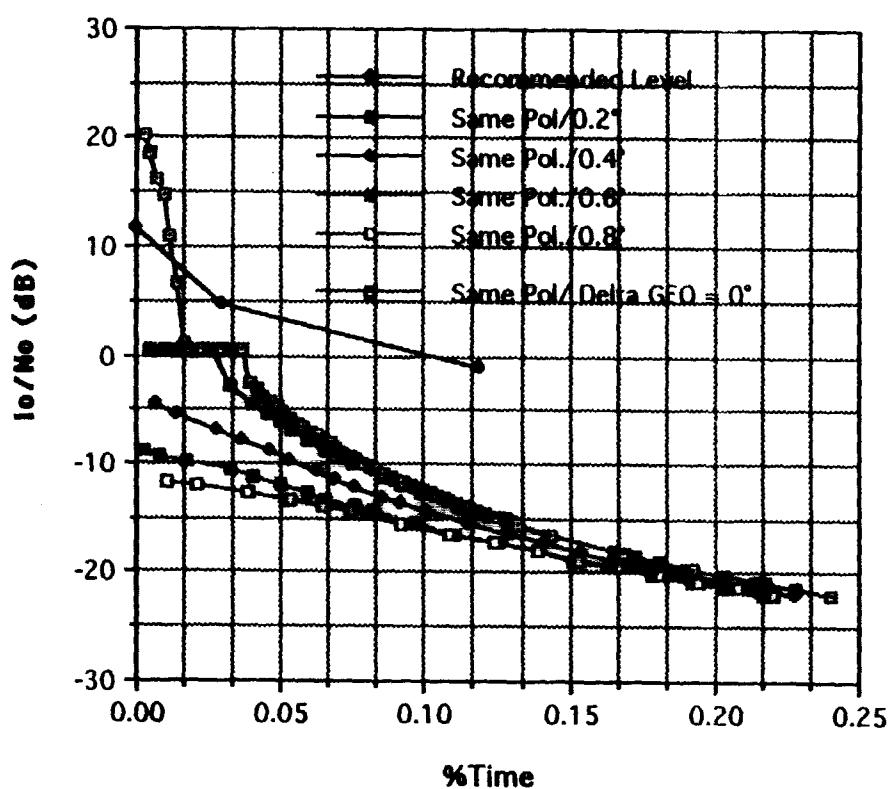
Interference Between Odyssey™ and GSO/FSS Systems with 0.66m Terminals



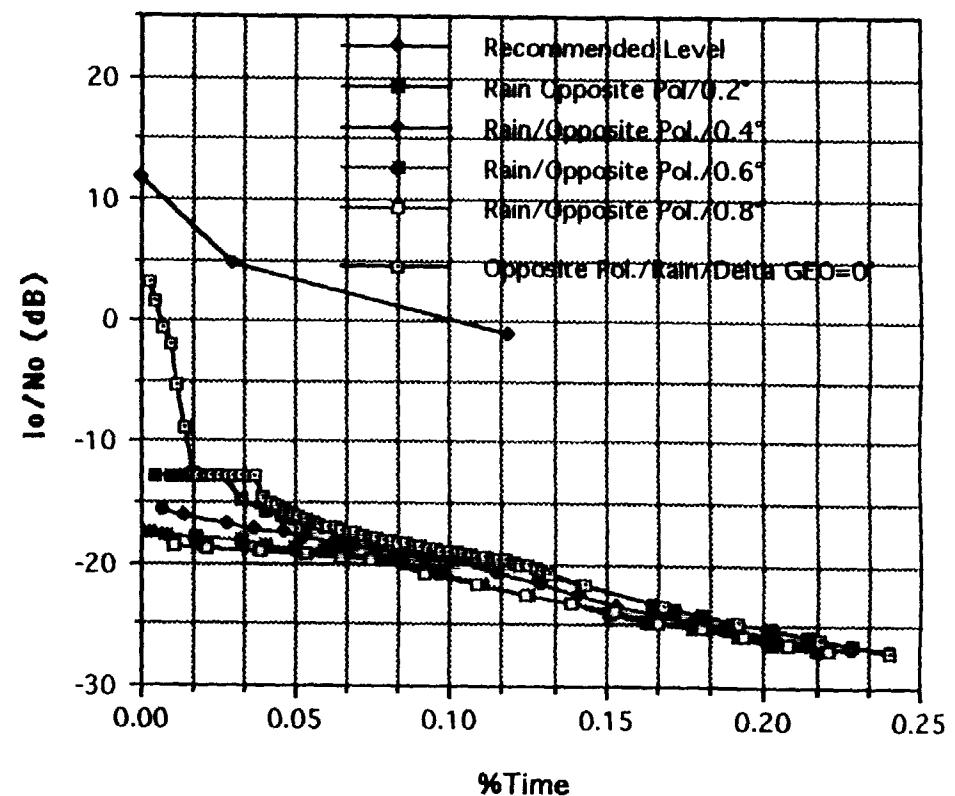
Interference From Odyssey™ Earth Station Into GSO/FSS Satellite

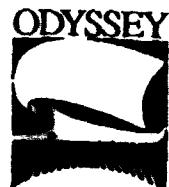


Same Polarization/Clear



Opposite Polarization/Rain

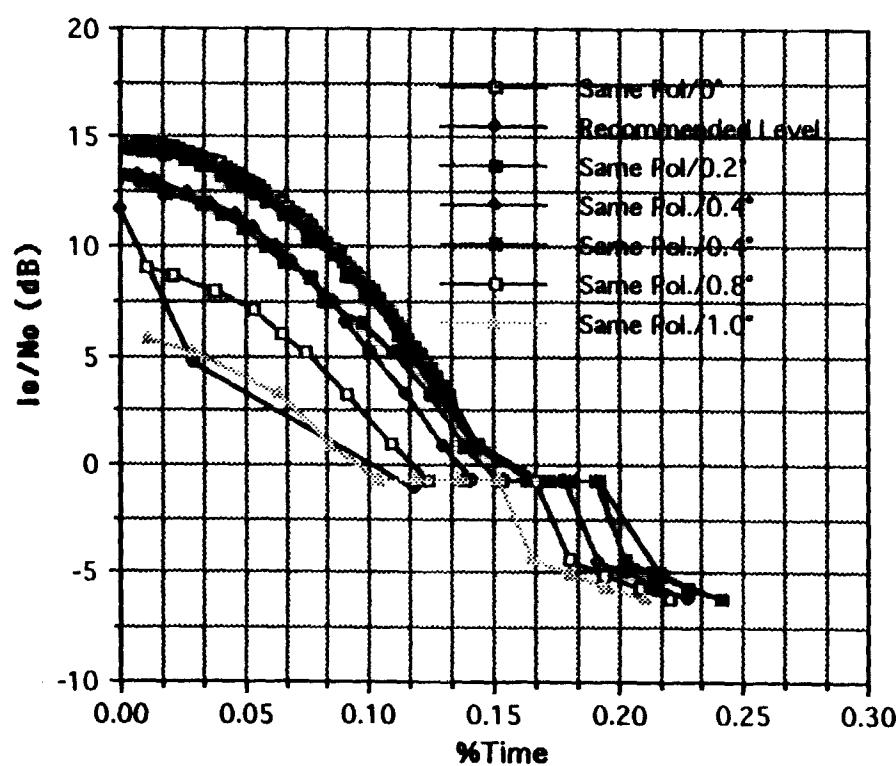




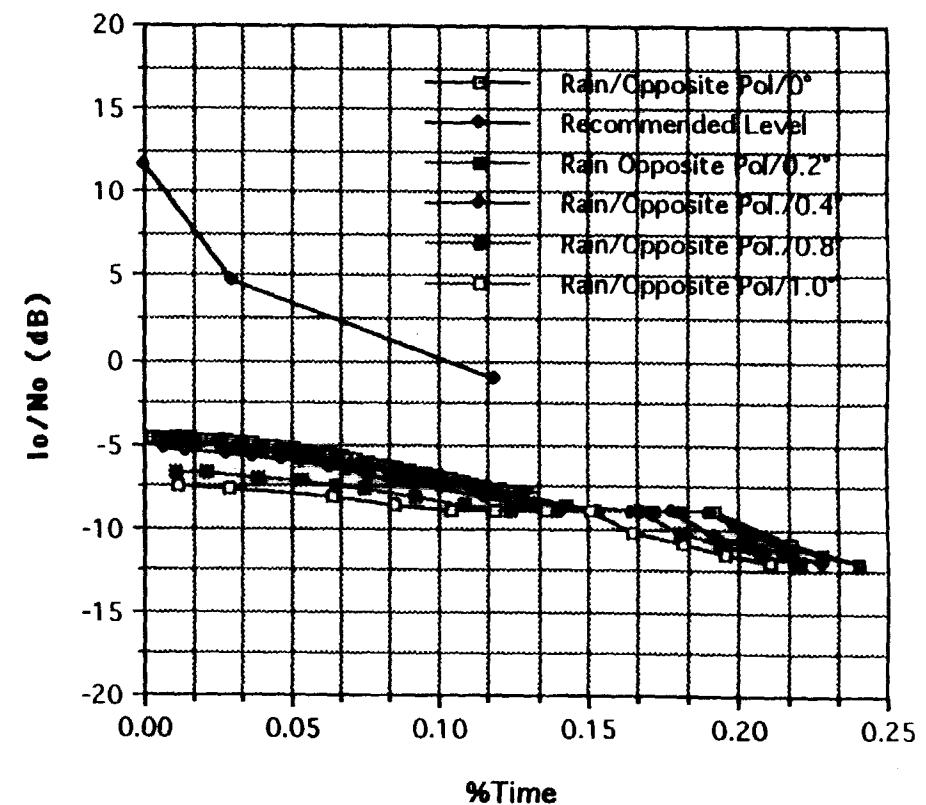
Interference From GSO/FSS 0.66m Terminals Into Odyssey Satellite

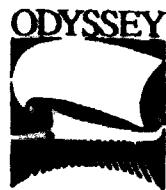


Same Polarization/Clear



Opposite Polarization/Rain

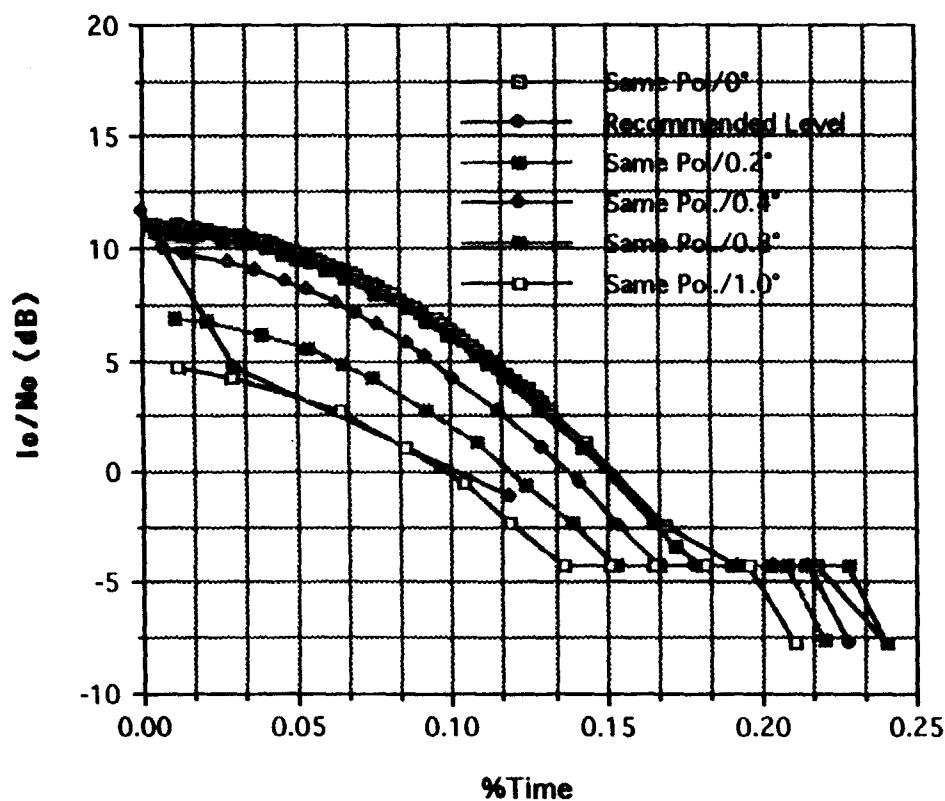




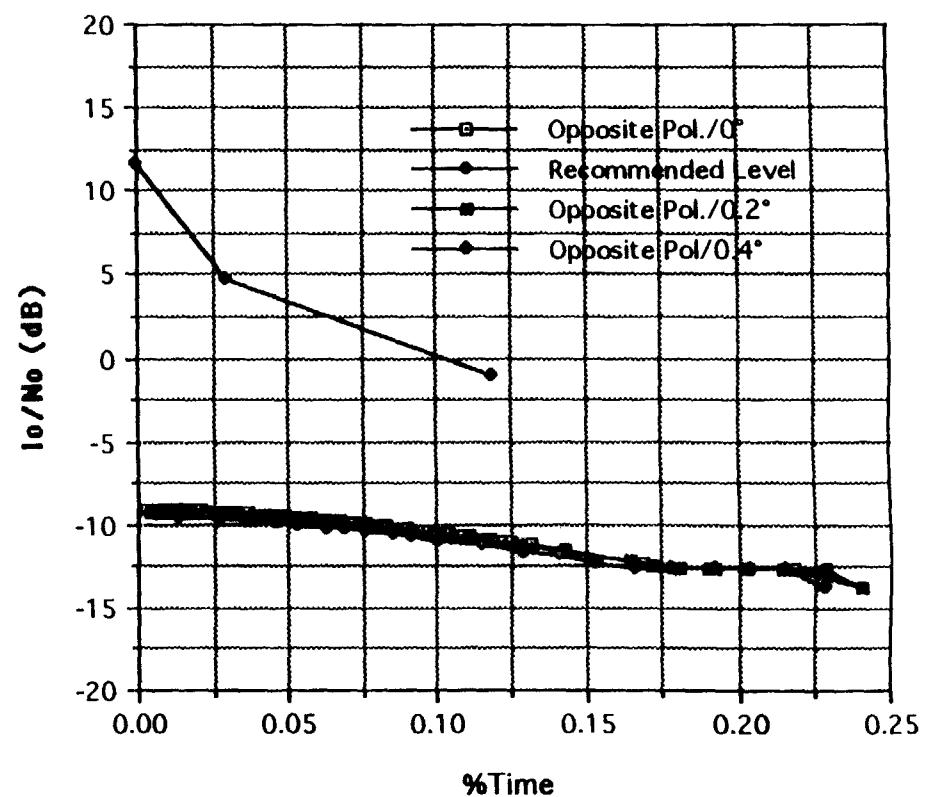
Interference From Odyssey™ Satellite Into GSO/FSS 0.66m Terminals

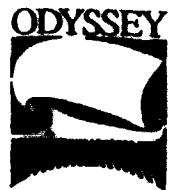


Same Polarization



Opposite Polarization

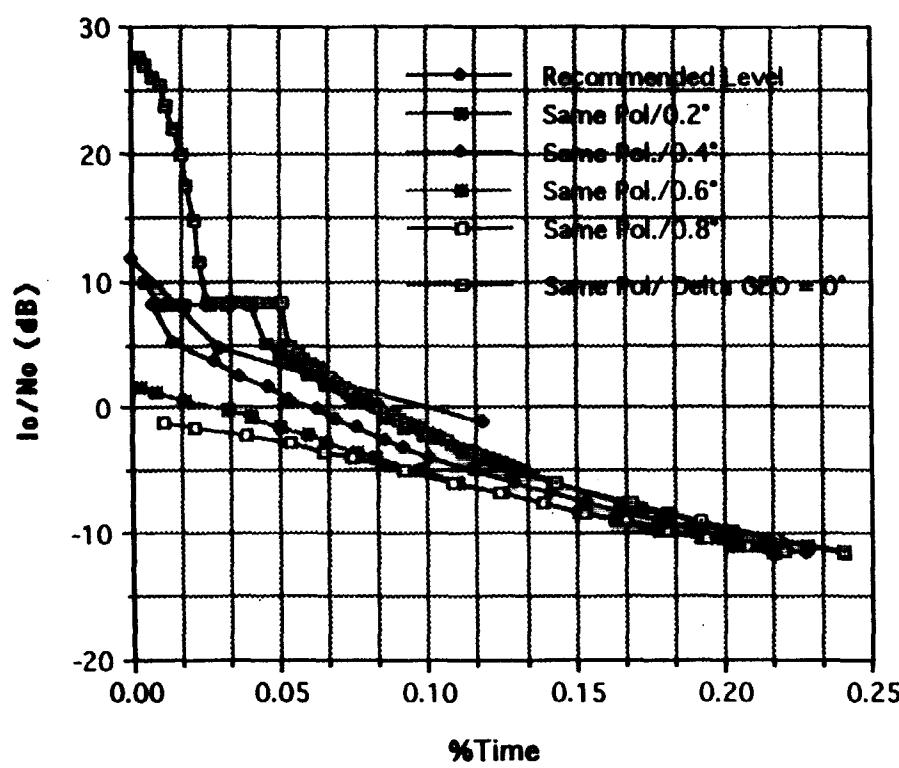




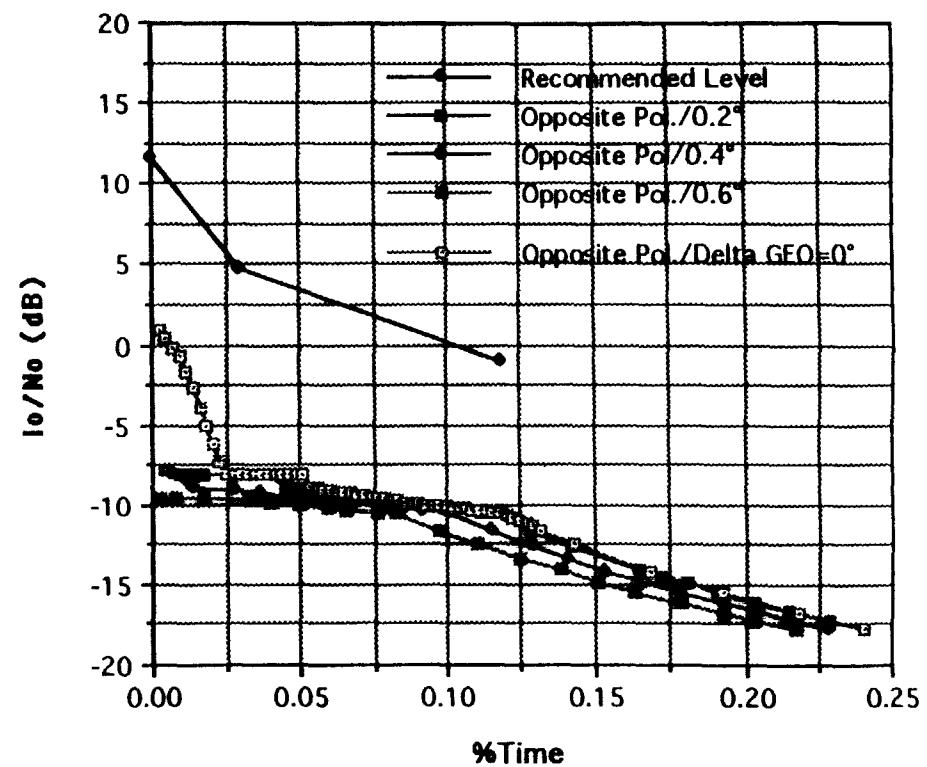
Interference From GSO/FSS Satellite Into Odyssey™ Earth Station

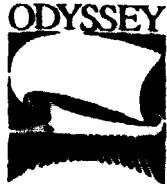
TRW

Same Polarization



Opposite Polarization





Conclusions



- The potential for unacceptable interference between Odyssey™ and GSO/FSS systems exists only for those GSO/FSS satellites (~41% globally) that result in an Odyssey™ earth station off-axis angle which is less than 1° (at an elevation angle > 30°)
- The interference period for a particular GSO/FSS satellite lasts no longer than two minutes and occurs at most twice a day
- Unacceptable interference can occur only for those GSO/FSS terminals located within a relatively small exclusion zone about an Odyssey™ earth station
- Unacceptable interference between Odyssey™ and a GSO/FSS system can be completely avoided if
 - The GSO/FSS system avoids use of the 150-MHz band shared with NGSO/MSS feeder links, or uses the opposite sense of polarization, in a beam covering the Odyssey™ earth station complex, or
 - The GSO/FSS system uses only large earth terminals within the Odyssey™ earth station exclusion zones, or
 - GSO/FSS terminals within the exclusion zones cease operating during the brief in-line-geometry periods